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JORDAN TOURISM DEVELOPMENT PROJECT II (JTD II)

**PETRA ARCHAEOLOGICAL PARK BACK EXIT ROAD REHABILITATION
PROJECT - TERMS OF REFERENCE FOR ENGINEERING WORKS
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**22170 PETRA ARCHAEOLOGICAL PARK BACK EXIT ROAD
REHABILITATION PROJECT - TERMS OF REFERENCE FOR
ENGINEERING WORKS**

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The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

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ACRONYMS

UNESCO	United Nations Educational, Scientific, and Cultural Organization
PAP	Petra Archaeological Park
PDTRA	Petra Development and Tourism Region Association

1. INTRODUCTION

Petra Archeological Park (PAP) is currently served by a single entry/exit point that, in effect, doubles the pressure on the site as tourists must walk the Siq path twice. This also diminishes the visitor experience by forcing an unnecessary return trip along an already-seen route.

PDTRA is proposing a transport system to convey visitors out of the Park using the existing Back Exit Road (Um Sayyhoun Road). The proposed system involves deploying shuttle vehicles to transport tourists from the Lower Gate (Abu Oleik Gate) to the visitor center. Minimal new construction is anticipated and minimum intervention in the existing condition is the preferred approach. Although the proposed vehicles will be selected to be compatible with existing road infrastructure, changes to the existing Back Exit Road may be necessary to accommodate the new transportation system. Early discussion and consultation with the transport system designers is required in order to identify any potential discrepancy arising in technical or design issues.

Petra is a designated UNESCO World Heritage Site and Jordan has legal and treaty mandates to protect this fragile resource. High priority must therefore be given to preserving the archaeological assets when planning and implementing physical interventions such as the proposed road rehabilitation. Given the archaeological and natural resource importance and sensitivity of PAP, the transport system is planned to be as environmentally friendly as possible.

This document presents the Consultant's Scope of Work for the study and design of the Back Exit Road rehabilitation to accommodate the proposed transportation plan. It will be the basis for drawing the consultant's technical offer for the design of the road rehabilitation scheme.

2. THE EXISTING BACK EXIT ROAD

The existing Back Exit Road links the Abu Oleik Gate with Um Sayyhoun gate and is approximately 1800 m long and consisting of an asphalt paved surface with an undivided width of 4-6 meters. The last 900 meters of the road leading up to Um Sayyhoun Gate is the steepest section, where the gradient reaches about 23%. A few sharp turns exist where the road changes direction as it snakes its way through difficult and steep topography. There are no shoulders or emergency parking bays. The pavement condition is generally good, although a few areas have started to show evidence of deterioration and edge erosion leading to sub-pavement cavitations.



Figure 1 – Back Exit Road



Figure 2 – A Sharp Turn on the Back Exit Road



Figure 3 – A Surface Drainage Culvert



Figure 4 – Back Exit Road on Approach to the Upper Um Sayyhoun Gate



Figure 5 – Lower Abu Oleik Gate where the Back Exit Road Starts

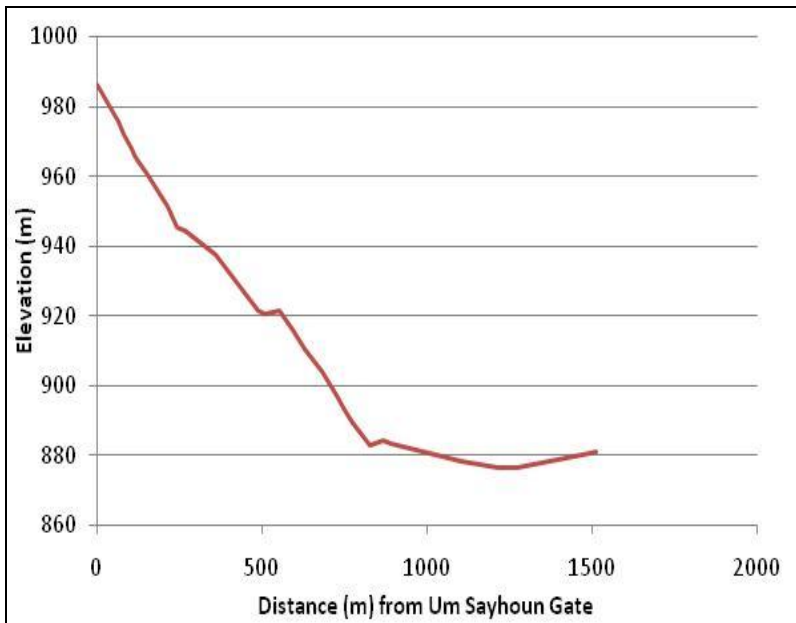


Figure 6 – Ground Elevation of the Back Exit Road

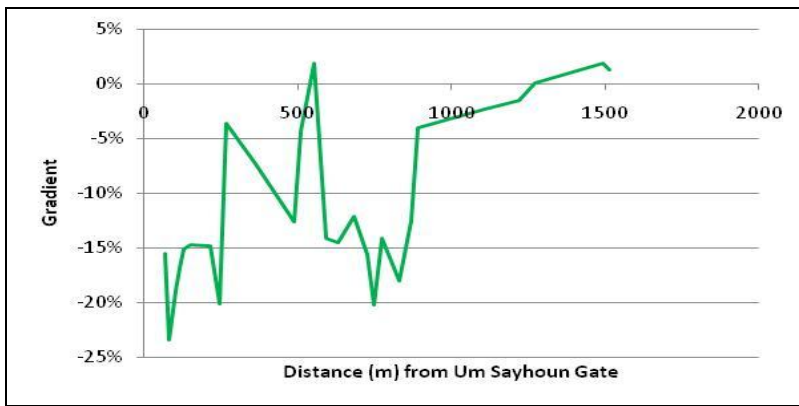


Figure 7 –Gradient of the Back Exit Road (Longitudinal)



Figure 8 –Flooding occurs in the Turkmaniyya Tomb Area

3. CONSULTANT'S SCOPE OF WORK

The scope of work for the Consultant will include the following tasks:

1. EXISTING CONDITIONS

Study the existing conditions of the Back Exit Road with a view to assess the risks and limitations faced in using this road for the proposed shuttle service. This would include the following:

- Horizontal and vertical road alignment;
- Road width;
- Road pavement;
- Flood hazard;
- Road stability and landslide risk;
- Surface water drainage; and
- Topography.

2. ESIA AND OUTSTANDING UNIVERSAL VALUE OF THE SITE

Review and study the Environmental and Social Impact Assessment (ESIA), taking into account its results during the road rehabilitation study.

The protection and conservation of the natural and cultural value of the site is paramount. The Consultant should determine the areas that need to be rehabilitated and avoiding any adverse effects on the natural, visual or archaeological character of the area.

3. SURVEY

Conduct a topographic survey for a corridor of a width of 30m from the road's centerline (15m on each side). The Consultant should consider:

- Minimizing the need for cut and fill;
- Reducing the vertical slopes and vertical curves; and
- Determining the need for and proposed location(s) of any retaining wall(s) to protect the road's sides. Any such walls should be made of local stone.

4. CATCHMENT AREA

With regard to storm water drainage and the catchment area where the back exit road is located, the Consultant should be guided by, and work in harmony with, any extant Nabatean irrigation system and undertake the following:

- Assess effectiveness of current installations;
- Based on the assessment, as necessary, re-design / rehabilitate the main culverts along the Road, including the culvert below Um Sayyhoun Gate, culvert at the Turkmaniyya Tomb, and the culvert at Abu Oleik (Lower Gate);
- Design a roadside storm water drainage line which discharges to the main culverts, providing adequate longitudinal and cross drainage along the whole road;
- Where needed, design flood attenuating walls and retaining structures;
- Using the current design of the existing water structures in PAP in terms of the form, color and construction material used;

5. SERVICES INFRASTRUCTURE

- Determine the electric loads needed by the main restaurants and museums located in the Basin area;
- Determine the water capacity needed by the facilities in the Basin area;
- Integrate electrical and water services into road rehabilitation solution, redirecting the existing water pipe to meet a new, rationalized system.

6. ASSOCIATED DESIGN REQUIREMENTS

Develop the optimum design encompassing the necessary changes for the Back Exit Road to accommodate the proposed shuttle service taking into account, the following:

- Liaison with the transport system designers to obtain relevant information on the proposed shuttle bus service, making early notification of challenges arising. Design to fulfill requirements of the shuttle buses including length, width, weight, travel speed, turning radius and any other special vehicle requirements;
- Necessary road safety features;
- Passenger (tourist) pick-up and drop-off points and the related rest areas;
- Vehicle passing lanes or bays (where two vehicles traveling on the Back Exit Road are designed to meet);
- Include any road shoulder areas as part of the main road.
- Design improved pedestrian safety facilities including full length footpaths (no concrete surfaces) and pedestrian crossings (as necessary);
- Design a road pavement with a twenty year design life;
- At the Abu Oleik Gate, study any requirements to rehabilitate this area including working levels and protection for the wadi. A tourist waiting and loading area is to be provided at this location.

7. OVERALL APPROACH: LOW IMPACT AND MINIMUM INTERVENTION

It is intended that the scope of physical intervention on the existing road be minimized, in terms of cut and fill, road widening, new construction for vehicle turning areas and pick-up/drop-off points, etc.

Any new structural work for stabilization should use gabions that are clad with local stone as retaining walls and minimize any cut(s) needed.

Environmental impact is to be avoided and work undertaken in compliance with the ESIA, before and during construction.